

(19) Japan Patent Office (JP)

(11) Publication Number  
S54-56654

(12) Official Gazette for Kokai Patent Applications (A)

(51) Int. Cl. <sup>2</sup>	ID No.	(52) Classification in Japanese	In-office reference No.	(43) Date of publication:
B 05 D 5/00 #		25(5) A3	6683-4F	May 7, 1979
B 44 C 1/20			7001-3B	
			Number of inventions 1	
			Examination requests	Unexamined
				(Total 3 pages)

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(54) Method for manufacturing decorative panels

(21) Application Number: S52-98407

(22) Application date: August 16, 1977

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#### Specifications

##### 1. Name of invention

Method for manufacturing decorative panels

##### 2. Claims

- (1) This method for manufacturing decorative panels features: scraping out the concave portion of a suitable pattern on the top surface of a panel made from calcium silicate board or other more or less homogeneous materials; filling the concave portion with a colored ink; immediately applying a vacuum to the underside of the panel; and causing the colored ink to seep through to the underside.
- (2) The method for manufacturing decorative panels set forth in Claim 1 also features, after getting the colored ink to seep through to the underside of the panel, evenly removing the surface layer of the underside of the panel.
- (3) The method for manufacturing decorative panels set forth in Claim 1 also features, after getting the colored ink to seep through to the underside of the panel, partially removing the underside of the panel.

### 3 . Detailed description of the Invention

This invention is a method for manufacturing decorative panels which have vignetted patterns on their surface.

From the prior art, in order to produce decorative panels with exuded, vignetted and other patterns, photogravure printed paper or some other sheet is pasted on the surface of the base board, or the pattern is applied through an image transfer, but in either case the result is an undifferentiated pattern that lacks a natural appearance and a designer look. Thus, because the pattern is applied only to the surface of the base board, defects may occur, such as: the pattern may be partially missing owing to flaws, etc, the exterior may appear considerably damaged, the commercial value may decrease and so on.

This invention eliminates these defects, abundantly inspires a feeling of nature, and even if the surface is damaged, provides a method for manufacturing decorative panels with color patterns that never disappear.

In other words, this invention's manufacturing method features: scraping out the concave portion of a suitable pattern on the top surface of a panel made from calcium silicate board or other more or less homogeneous materials; filling the concave portion with a colored ink; immediately applying a vacuum to the underside of the panel; and causing the colored ink to seep through to the underside.

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A working example of this invention is explained in the diagram. First, the concave portion (2) is scraped out, forming a suitable pattern on the top surface of the panel (1). The panel's (1) top surface becomes the manufactured decorative panel's rear surface, and the bottom surface becomes the front surface.

It is acceptable for the concave portion (2), which has been scraped out in the shape of the pattern, to create shallow and deep parts, or parts with different dimensions. It is also acceptable to scrape out the entire concave portion at more or less the same depth.

Next, after filling this concave portion (2) with a colored ink (3), immediately use an appropriate vacuum suction device to evenly apply suction to the bottom surface of the panel (1). The colored ink in the concave portion (2), because of the suction force, will penetrate through the inside of the panel, reaching the bottom surface. The exuded pattern (4) is formed by the ink, which appears to enlarge the pattern of the bottom surface's concave portion (2).

In this way, porous materials composed of calcium silicate board, mineral fiber board, plasterboard and similar, essentially homogeneous materials are suitable for use in panels to be infused with colored ink. In contrast, materials such as plywood, in which a direction is created by the wood grain for the penetration of the colored ink, are unsuitable, because it is difficult for a suction force to point that direction at the suction source. However, for panels composed of materials with comparatively large grains, such as particle board, perlite board, etc, sometimes patches or spots occur from penetration of colored ink.

Additionally, in order to form the abovementioned concave portion (2) in the case of embossed finishes, for which existing methods of forming concave portions are generally employed, the density of the panel increases, owing to the compression in the concave pattern of the bottom surface, and despite the suction force from the bottom surface of the panel, the penetration of colored ink within the concave portion to the inside of the panel is inhibited, and the suction effect decreases, so this is undesirable.

Therefore, in the method of this invention, a drill or router is used to scrape out the concave portion of a suitable pattern, avoiding any change to the density of the material in the panel.

By changing the depth of this concave pattern according to the actual pattern, even if they are concave patterns with the same shapes and dimensions, the colored ink in the deep part causes a dark pattern to appear on the bottom surface, due to the suction from the bottom surface, while the shallow part forms the part of the pattern with faded color.

The colored ink used is a dye or pigment as a solution or dispersed in a liquid. The colored ink should be one which

penetrates into the inside portion of a panel.

Such a colored ink (3) is used to fill the inside of the concave portion (2) of panels of the aforementioned type, and immediately afterward suction is applied from the bottom surface of the panel. However, if suction is only applied in certain parts, the colored ink located in the concave portion that is more or less directly above the suction part vertically will exude to the correct place on the bottom surface of the panel (1), but the colored ink in other concave portions will be sucked obliquely within the panel, making it impossible to form the desired pattern. As such, evenly applying suction to the entire bottom surface of the panel (1) will cause the concave portion of the pattern on the top surface to appear at the corresponding location on the bottom surface.

As a result of this suction, the colored ink (3) within the concave portion (2) passes through the inside of the panel (1), spreading out in a spindle shape, as shown in Figure 4, exuding to the bottom surface, and, as shown in Figure 5, appears as a vignetted or exuded pattern (4) on this bottom surface.

In the method of this invention, after colored ink exudes to the bottom surface of panels in this way, erasing this bottom surface by, for example, sanding, is also effective.

It sometimes happens, depending on the panel (1), that the bonding agent used at the time the panel is manufactured moves to the surface of the panel, because the bonding agent sometimes blocks the colored ink from appearing on the surface (rear surface).

However, before implementing the method of this invention, the same effect can be obtained by sanding the surface (bottom surface) first.

Also, partially erasing the surface of manufactured decorative panels, which the bottom surface of the panels during manufacture becomes, also has an effect on the design.

In other words, by partially erasing, the color from the colored ink which exudes from the concave portion appears dark. So by combining concave portions of this kind, it is possible to have a wide range of designs.

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As noted above, this invention features: scraping out the concave portion of a suitable pattern on the top surface of a panel made from calcium silicate board or other more or less homogeneous materials; filling the concave portion with a colored ink; immediately applying a vacuum to the underside of the panel; and causing the colored ink to seep through to the underside. Thus, since the colored ink in the scraped out concave portion of the panel's top surface, passing through the inside of the panel, appears on the lower surface as a pattern, compared to printing, etc, there is a feeling of abundant inspiration from nature, and it is possible to obtain patterns with some depth. Through the process of suction, accidental overlapping color portions arising from the exuding colored ink are obtained, and the feeling of naturalness is further increased, which can cause a richly elegant pattern to appear. Additionally, the colored part which forms this pattern stays within the inside of the panel, so even if the panel surface is damaged, the pattern will not be defective. As such the exterior will never appear defective.

Additionally, taking the method of this invention into account, by changing the depth of the concave portion of the pattern, which has been scraped out of the panel's upper surface, and the colored ink which fills the concave portion, it becomes possible to obtain decorative panels which have been given harmonized shades of color and a gorgeous multi-color feel.

#### 4 . Brief Description of the Drawings

These drawings demonstrate working examples of this invention. Drawing 1 is the panel's front elevation. Drawing 2 is a cross-section diagram which shows the panel with the concave portion created. Drawing 3 is a cross-section diagram which shows the concave portion filled with colored ink. Drawing 4 is an illustration showing the penetration of colored ink due to suction. Drawing 5 is the front view of manufactured decorative panels.

- (1) Panel
- (2) Concave portion
- (3) Coloring liquid
- (4) Exuded pattern

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